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(56) Documents cited

GB 2189511 A EP 0127360 A2 EP 0043429 A1

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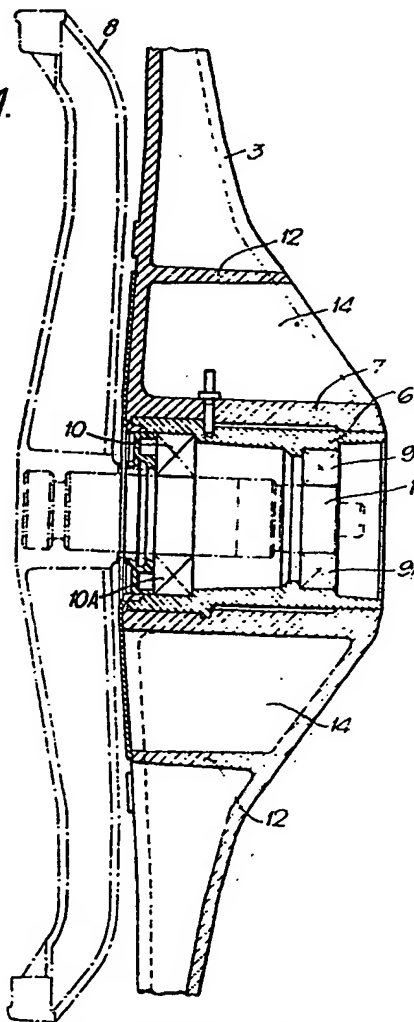
Online databases: WPI

(54) Plastics washing tub

(57) A washing tub of plastics, which is preferably used in domestic clothes washing machines, comprises a rigid structure formed by the cylindrical peripheral strip portion (2, figure 2) and a circular end wall 3, and a circular front wall, and a through hub 6 disposed at the centre of the end wall, said hub being fitted into the central cylindrical hub-carrying portion 7 which is surrounded by one or more chambers and/or cavities which are adjacent to said portion 7 so that said portion 7 does not come into contact with the washing liquid.

Preferably on the inside of the tub the portion 7 surrounding said hub is protected by a plate (15, figure 3) preferably of plastics, which prevents the washing liquid from flowing directly over said plastics material zone.

Fig.1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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Fig.1.

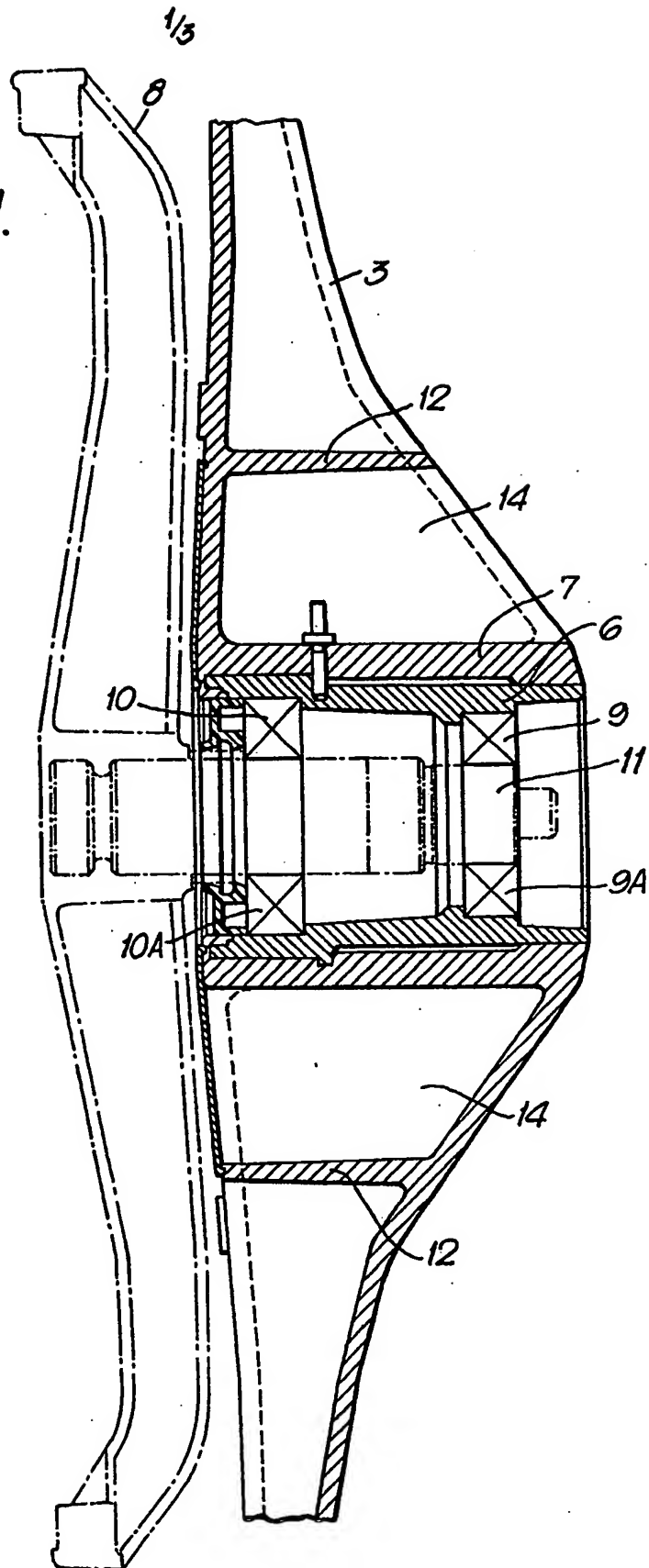
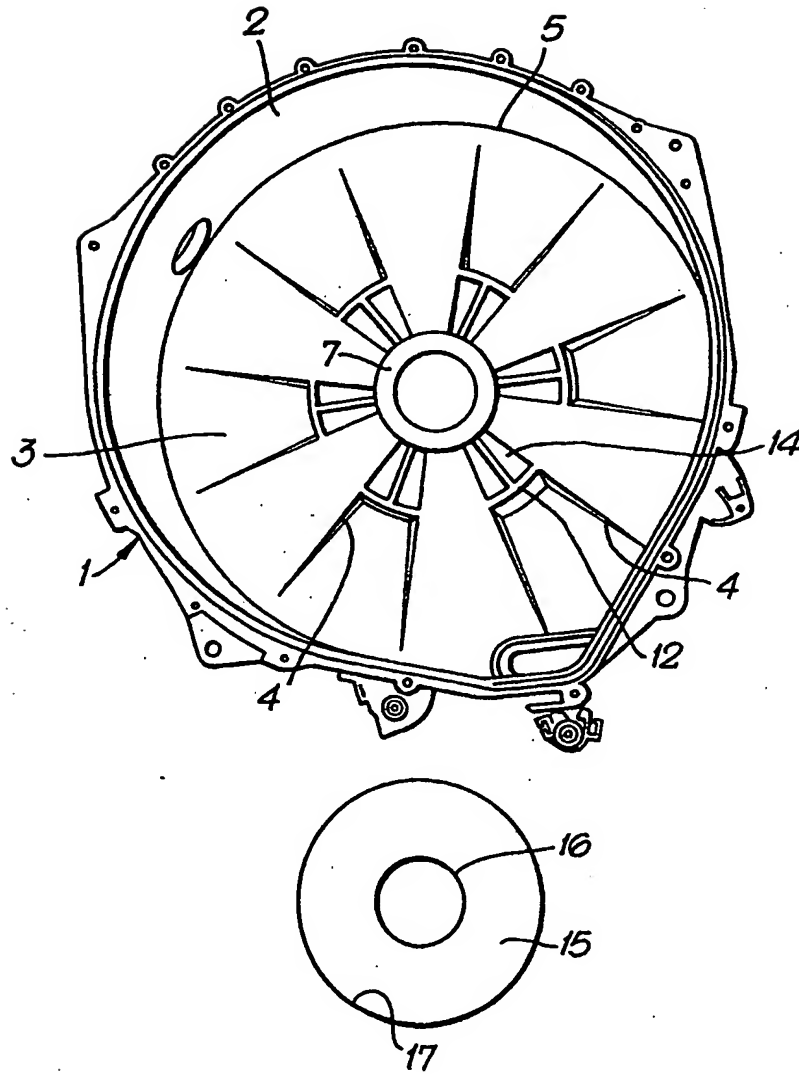
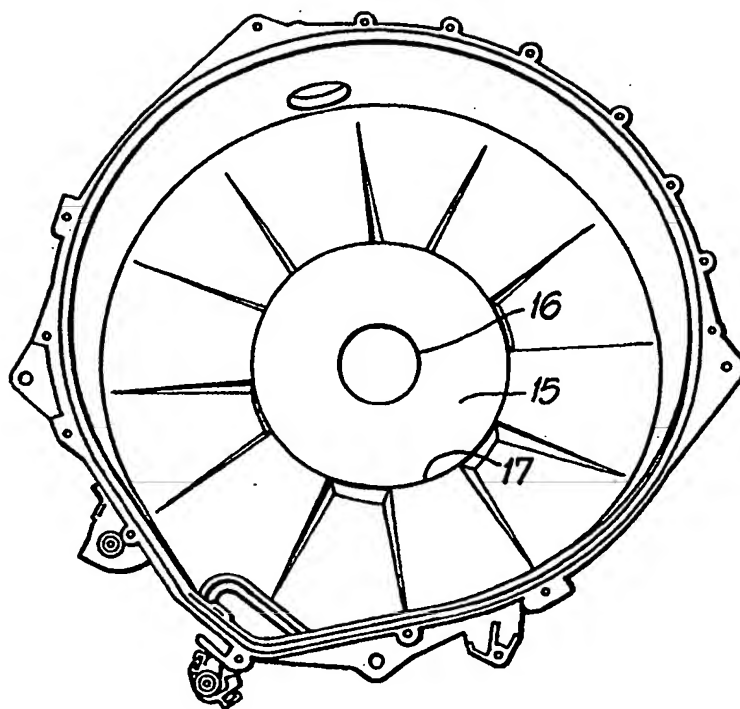


Fig. 2.



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Fig. 3.



PLASTICS TUB FOR WASHING MACHINE

The invention concerns a particular type of plastics tub for a washing machine, in particular a laundry washing machine for domestic use.

Plastics washing tubs for laundry washing machines are known, which in substance comprise a rigid structure forming the peripheral cylindrical wall portion and a circular end wall, and a front wall which is sometimes separate, also of circular shape, which is capable of being joined to the rigid structure by per se known fixing means.

A number of ribs, preferably radially extending, normally integrally provided at the end wall in order to increase the strength of the tub, the ribs originating from the central zone of the rear wall. Provided in that central zone is a through hole into which is fitted the shaft for providing support and rotary movement of the drum which is contained with the tub, the shaft being keyed externally of the tub onto a pulley which is subjected to the action of a belt for transmitting to the pulley the motion for producing rotary movement of the drum.

In order to support the shaft of the drum and to permit rotary movement of the shaft with the minimum amount of wear and in order to guarantee sealing integrity in regard to leaks of the washing liquid to the outside, the hole is normally fitted with a hub which is coaxial with respect thereto and which carries the bearings for the shaft, the hub normally being locked against the inside wall of the hole by means of the plastics material of the tube being moulded directly against the hub.

While on the one hand the provision of the hub is required in particular to afford support for the shaft and to provide for sealing integrity of the tub, it does suffer from the disadvantage of being directly affected by the relatively high temperatures (up to 90°C) to which the

washing bath is raised, the washing bath acting directly on the central zone of the rear wall of the tub.

It has been noted in some cases that the action of the high temperature which is thus attained by the plastics which surrounds and locks the hub generates a succession of thermal shocks, in particular in machines which operate with recycling of the washing liquid.

By virtue of the mechanical action exerted by the shaft as it rotates against the hub, that gives rise to progressive stressing in the plastics material which, after a certain period of time, ages and degrades the general mechanical characteristics, and can also manifest itself by the loss of sealing integrity and loosening of the hub from its plastics seat.

The aim of the present invention is therefore that of providing a washing tub with structural and functional characteristics which are better than those of the present tubs, which withstands in the course of time the risks of deterioration and consequential loosening of the hub.

According to the present invention, there is provided a washing tub of plastics material for a laundry washing machine comprising a rigid structure formed by a cylindrical peripheral wall portion and a circular end wall, and by a circular front wall which can be assembled to said rigid structure by known fixing means, a through hub disposed at the centre of the end wall, said hub being fitted into a central cylindrical hub-carrying portion of the end wall to receive a drive shaft for the drum, wherein said central hub-carrying portion is surrounded by one or more closed and empty chambers which are adjacent to said portion so that said portion does not come into contact with the washing liquid.

The invention will be better appreciated from the following description given solely by way of non-limiting example and with reference to the accompanying drawings in

which:-

Figure 1 is a diagrammatic view in vertical section of a plastics washing tub in accordance with the present invention;

5 Figure 2 is a perspective view of the Figure 1 tub view from the interior with the thermal shock protection means removed; and

10 Figure 3 is a perspective view of the Figure 1 tub with the thermal shock protection means in its definitive position.

Referring to the drawings, shown therein is a washing tub 1 of plastics material, which can be used in perse known fashion in a laundry washing machines, the tub being in substance constituted by a rigid structure formed
15 by the cylindrical peripheral wall portion 2 and the circular end wall 3, and a separate wall (not shown) which is also of circular shape and which is capable of being joined to the rigid structure by conventional fixing means.

In turn the end wall 3 can normally be provided
20 with a plurality of rigid straight ribs 4 which are angularly equally spaced from each other and which extend radially towards the peripheral edge 5 of the end wall, starting from a through hub 6 disposed at the centre of the end wall, the hub being fitted into the central cylindrical
25 hub-carrying portion 7 of the end wall 3 and supporting the central shaft 11 for supporting the drum 8, by means of pairs of bearings 9, 9a, 10 and 10a which are disposed in known fashion on the inside wall of the hub and the use of which is likewise known.

30 The end wall 3 is substantially constituted in the form of a Greek fret design, with portions which are more set back alternating with portions which are more set forward, with the lines of demarcation between the portions of alternate depth being formed by the ribs 4.

35 For the sake of improved robustness the straight

ribs 4 have in interposed relationship at least one circular collar 12 which is provided in one piece with the end wall of the tub and which, with the end wall 3 and with the walls which join said portions of the end wall of the tub of alternate depths, provides cavities 14 which are adjacent to the central cylindrical hub-carrying portion 7.

In operation the cavities 14 are affected by the washing liquid causing the above-described thermal shocks.

To avoid this disadvantage, the invention lies in the provision of a thermal protection 'collar' which is substantially formed by one or more closed chambers disposed in contiguous relationship around the circular plastics collar 12 in such a way as to encase it completely, so that the collar 12 is not directly bathed by the washing liquid.

Preferably, and with reference to the foregoing description and to the drawings, the closed chambers are produced in a simple manner by providing a thermal protection element 15, preferably flat and of plastics material, of circular shape and with a circular opening 16 disposed in the centre of the protection element 15.

As shown in Figure 3, the protection element is applied to the end wall 3 of the tub and its dimensions are such that its outward edges 17 correspond to the above-mentioned circular collar 12 and its inward edges correspond to the above-mentioned circular cylindrical portion 7.

After the protection element has been fitted, the outward and inward edges 17 are closed and sealed by means of welding or by other known means to the respective collar 12 and cylindrical portion 7 in such a way as to convert the above-mentioned cavities 14 into corresponding closed chambers.

In that way the outward zone of the portion 7 is no longer directly in contact with the washing liquid and, as laboratory tests have fully demonstrated, the temperature of the portion 7 is kept sufficiently low and constant as

completely to avoid the undesired phenomenon referred to above.

5 The plastics protection element, although involving structural simplicity, is particularly effective because, not being subjected to mechanical stresses, even if it is directly in contact with the washing liquid it does not suffer deformation and it does not become detached from its mounting closure.

10 It will be appreciated that any tub 1 can be produced even in different shapes from that shown, without thereby departing from the scope of protection of the present invention. Production of the tub assembly which is completed in that way is therefore automatic and is achieved in a simple, reliable and economic manner.

CLAIMS

1. A washing tub of plastics material for a laundry washing machine comprising a rigid structure formed by a cylindrical peripheral wall portion and a circular end wall, and by a circular front wall which can be assembled to said rigid structure by known fixing means, a through hub disposed at the centre of the end wall, said hub being fitted into a central cylindrical hub-carrying portion of the end wall to receive a drive shaft for the drum, wherein said central hub-carrying portion is surrounded by one or more closed and empty chambers which are adjacent to said portion so that said portion does not come into contact with the washing liquid.

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2. A washing tub according to claim 1 wherein the end wall is substantially constituted in the form of a Greek fret design, with portions which are set back alternating with raised portions defined by suitable ribs which are orthogonal to said end wall, and by at least one circular collar provided in the end wall of the tub and which projects from same over the height of said raised portions and which, with said end wall and with said ribs, provides cavities which are adjacent to the central cylindrical hub-carrying portion, the tub comprising a protection element applied sealingly against the surface zone of said central portion against the edge of said collar and against said raised portions of the end wall of said tub, in such a way as to transform said cavities into corresponding closed chambers.

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3. A tub according to claim 2, wherein the protection element is flat, of plastics material and of circular shape with a circular opening disposed in its centre.

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4. A tub constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
- 5 5. A laundry washing machine incorporating a wash tub according to any one of the preceding claims.

Amendments to the claims
have been filed as follows

1. A washing tub of plastics material for a laundry washing machine comprising a rigid structure formed by a cylindrical peripheral wall portion and a circular end wall, and by a circular front wall which can be assembled to said rigid structure by known fixing means, a through hub disposed at the centre of the end wall, said hub being fitted into a central cylindrical hub-carrying portion of the end wall to receive a drive shaft for the drum, wherein said central hub-carrying portion is surrounded by one or more closed and empty chambers which are adjacent to said portion so that said portion does not come into contact with the washing liquid, and wherein the end wall is substantially constituted in the form of a Greek fret design, with portions which are set back alternating with raised portions defined by suitable ribs which are orthogonal to said end wall, and by at least one circular collar provided in the end wall of the tub and which projects from same over the height of said raised portions and which, with said end wall and with said ribs, provides cavities which are adjacent to the central cylindrical hub-carrying portion, the tub comprising a protection element applied sealingly against the surface zone of said central portion against the edge of said collar and against said raised portions of the end wall of said tub, in such a way as to transform said cavities into corresponding closed chambers.
2. A tub according to claim 1, wherein the protection element is flat, of plastics material and of circular shape with a circular opening disposed in its centre.

3. A tub constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
- 5 4. A laundry washing machine incorporating a wash tub according to any one of the preceding claims.

Relevant Technical fields

(i) UK CI (Edition L) D1A (AFA, AFB, AFC)

(ii) Int CI (Edition 5) D06F

Databases (see over)

(i) UK Patent Office

(ii)

ONLINE DATABASES: WPI

Search Examiner

T M JAMES

Date of Search

5 JANUARY 1993

Documents considered relevant following a search in respect of claims

1-5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2189511 A FAINI (see page 1 lines 99-105 and figures 1 and 2)	1+5
X	EP 0127360 A2 THORN EMI (see figures 4-7)	1+5
X	EP 0043429 A1 ZANUSSI (see figures 1 and 2)	1+5

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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